REMARKS AND ARGUMENTS

A. Claim Status

Claims 22-52 are pending in the application.
Claims 22-52 were rejected under 35 U.S.C. § 103 (a)

B. Amendments

Claim 22 has been amended with respect to the term "carrier substance". This amendment is supported by the specification at page 6, paragraph 1, and at page 7, paragraph 4. No new matter has been introduced.

C. Arguments and Remarks

1. Response to Claim Rejections under 35 U.S.C. § 103 (a)

In the section titled "Claims Rejection - 35 U.S.C. 103" (paragraphs 2 and 3) of the Office Action mailed November 5, 2004, Claims 22-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,378,499 to Spangler in view of Kublak, U.S.Patent No. 5,577,092. Applicants respectfully traverse.

The Examiner's arguments appear to be verbatim identical to those in the Office Action of May 6, 2004, under the heading "Claims Rejection - 35 U.S.C. 103". Further to the comments submitted in Applicants' response to that Office Action, Applicants respectfully submit the following.

The MPEP, Section 2143, contains the following, as a summary of numerous cases defining what is and what is not a proper prima facie obviousness rejection:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

Comments on Spangler et al. '499

Spangler et. al. '499 does not contain motivation, either explicitly or implicitly, to use clusters instead of a gas as a carrier substance.

Spangler et al. disclose an ion mobility detector being adapted to detect the mass/charge-ratio of sample molecules for analytical purposes. For producing the ionized sample molecules, the sample S is injected together with a carrier gas into the ion mobility detector (see the attached schematic illustration and e.g. Fig. 3 of Spangler et al. '499).

The carrier gas is e.g. nitrogen or air (column 1, line 25) while the sample is provided as a gas (i.e. as molecules) as well (see e.g. column 1, lines 38, 39).

It is important to note that the carrier gas used in the conventional ion mobility detector is completely different from the carrier substance cited in claim 22. The carrier substance of the present invention is the material of the neutral cluster. This material is called a "carrier" as the neutral cluster is loaded with a reaction partner according to the second step of the present method. On the contrary, Spangler et al. '499 disclose a carrier gas comprising molecules but not clusters.

In the first step of ionization, e.g. with the ionization source 21 shown in Fig. 3 of Spangler et al., electrons are separated from the carrier gas molecules and from the sample molecules as illustrated in the attached schematic figure. The free electrons are collected by the container

walls. As a result, positively charged sample molecules are produced by the first ionization (column 1, lines 29, 30).

After the first ionization, a second ionization occurs due to collisions between neutral sample molecules which have not yet been ionized and positive carrier gas ions. As a result of these collisions, electrons are transferred from the sample molecules to the positive carrier molecules so that further positively charged sample molecules are obtained (column 1, lines 39-43).

It is important to note that these processes occur without any cluster formation or cluster fragmentation.

The technical idea of Spangler et al. '499 is given by a reaction of the sample S before the first ionization in order to influence the capability to be ionized in a specific manner. As a result, the selectivity of the ion mobility detector can be increased (see abstract).

This reaction of the sample molecules before the first ionization is obtained by a surface interaction, e.g. on the component 31 shown in Fig. 3. It is important to note that the sample molecules are not ionized during this surface reaction but rather modified for having a more or less ionizable form (column 5, lines 51 to 57).

Hence, no motivation to use clusters instead of a gas as a carrier substance is provided in Spangler et. al. '499.

Comments on Spangler et al. '624

This reference teaches away from the use of clusters in mass spectrometry.

Spangler et al. '624 essentially represents the same technique as disclosed in Spangler et al. '499. The new aspect introduced by '624 is given by the injection of acetone or carbon tetrachloride into the ion mobility spectrometer. These substances are used as references in the ion spectra (see abstract, paragraph 2, penultimate sentence). These substances will react with molecules of the sample without a tendency to form clusters (column 8, line 58 to column 9, line 2).

Hence this reference teaches away from the use of clusters in mass spectrometry. This is contrary to providing a motivation to combine references.

Comments on the invention

In contrast to the Spangler et al. technique, the ionization of the invention occurs without an external ionization source. The neutral cluster forms a reaction space in which a carrier separation occurs during cluster fragmentation. As the carrier separation is faster than the cluster fragment separation, different fragments with different charges are formed as shown in the attached schematic figure (corresponding to Fig. 1 of the present patent application).

Again, Spangler '499 and '624 provide no motivation for modification or combination to produce the invention under examination.

The Kublak invention cannot be combined with the Spangler invention without the Kublak invention being rendered unsatisfactory for its intended purpose.

Applicants' patent application discloses a novel ionization mechanism that allows converting neutral particles into ionized particles. On the other hand, Spangler discloses methods to tailor the identity of existing ions to experimental needs. The two methods are different and have no common objective. It is not true that by simply adding a supersonic nozzle to the setup of Spangler applicants' ionization method can be obtained, since the physical conditions inside the ion mobility spectrometer are incompatible with cluster formation by adiabatic expansion.

Applicants therefore respectfully submit that the present claims are not obvious. The references cited by the Examiner are based on physical phenomena distinct from those of the present claims.

The Kublak invention cannot be combined with the Spangler invention without the Kublak invention being rendered unsatisfactory for its intended purpose.

2. Response to "Examiner's Response to Arguments", Section 4.

Novelty / Non-Obviousness

The subject matter of claim 1 is new over both Spangler et al. references as these do not disclose loading of a neutral cluster formed of polar molecules with a chemically different reaction partner and fragmenting the cluster into cluster fragments with different charges. With this regard, the arguments of the Examiner in the final action are discussed as follows.

The combining of the Spangler '499 reference and the Kublack '092 reference do not recite all of the claim limitations, either explicitly or implicitly. Spangler et al. '499 do not disclose any fragmenting of clusters as stated by the Examiner in item 3(a) (page 2 of the detailed action). The Examiner's reference to a fragmenting (item 3(c) on page 3 of the detailed action) is incorrect. Spangler et al. '499 do not disclose any fragmentation. Spangler et al. do not utilize alkali atoms but rather alkanes or alkyl halides (column 2, line 43). These substances are different from alkali atoms. The interpretation by the Examiner (page 7, line 9) is incorrect. The conventional secondary ionization with a charge transfer as a result of molecule collisions is completely different from a fragmentation (separation) of clusters into different fragments with different charges.

The Spangler '499 and Kublak references do not provide motivation, either explicitly or implicitly, for modifying or combining these references to produce the present invention. Neither reference by itself nor the combination of reference contains such motivation. The Kublak et al. reference does not give any information on the basis of which the Spangler et al. technique could be changed according to the invention. Kublak et al. represent technological background with regard to the cluster formation only. Neither Spangler et al. nor Kublak et al. give any indication of a charge separation in clusters as found for the first time by the present inventors.

Finally it is to be emphasized that Hartley does not disclose ionization based on cluster fragmentation. Hartley is absolutely silent with regard to clusters. Fracturing of molecules into fragments with different charge states as cited by Hartley (paragraph [0002]) represents a

completely different charge separation mechanism compared with the above reaction space concept of the invention.

D. Conclusions

Applicants respectfully submit that the rejections of Claims 22-52 under 35 U.S.C. § 103 (a) are improper, since the Examiner has not properly demonstrated prima facie obviousness. The cited references do not provide motivation to modify or combine to produce the claimed invention. The invention of Kublak cannot be combined with the Spangler invention without the Kublak invention being rendered unsatisfactory for its intended purpose. The Spangler '624 patent, cited as a secondary reference, teaches away from the claimed invention.

Applicants believe that the foregoing amendment and remarks have overcome or rendered moot all grounds for rejection and objection, and that the application is in a condition for allowance. Applicants therefore respectfully request prompt action on the claims and allowance of the application. If the Examiner believes that personal communication will expedite prosecution of the application, the Examiner is invited to telephone applicants' undersigned agent directly.

AUTHORIZATION AND PETITIONS

Applicants believe that no extension of time is required to make submission of the response timely. However, in the event that an extension of time is required, Applicants hereby submit a petition for such extension of time as may be necessary to make this response timely. The Commissioner is hereby authorized to charge any necessary additional fees for extension of time or additional claims to deposit account No. 502194. A duplicate of this Authorization is enclosed.

Respectfully Submitted,

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Spangler '499 and '624

		1st ionization (ion. source)	2nd ionization (collisions)
Carrier C:	N_2	$N_2^+ + e^-$	N_2
			↑ e^-
Sample S:	S	$S^+ + e^-$	S^+

Invention